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09/814,324	03/21/2001	Motohiro Kawahito	JP919990309US1	3779

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EXAMINER

NAHAR, QAMRUN

ART UNIT	PAPER NUMBER
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2124

DATE MAILED: 10/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/814,324

Applicant(s)

KAWAHITO ET AL.

Examiner

Qamrun Nahar

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 July 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

1. This action is in response to the amendment filed on 7/20/04.
2. The objection to the specification is withdrawn in view of applicant's amendment and remarks/arguments.
3. The objection to claim 5 is withdrawn in view of applicant's amendment.
4. The rejection under 35 U.S.C. 112, second paragraph, to claim 5 is withdrawn in view of applicant's amendment.
5. Claims 1, 3, 5-10, 12-13, 15-16 have been amended.
6. Claims 17-18 have been added.
7. Claims 1-18 are pending.
8. The objections to claim 18 are pending.
9. Claims 3, 5 and 17-18 stand finally rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
10. Claims 1-2, 4, 6-7 and 10-16 stand finally rejected under 35 U.S.C. 102(e) as being anticipated by Dunn (U.S. 6,247,172).
11. Claims 3, 5, 8-9, and 17-18 stand finally rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn (U.S. 6,247,172) in view of Ghosh (U.S. 6,412,109).

Response to Amendment

Claim Objections

12. Claim 18 is objected to because of the following informalities: "the post processor" should be "the post-processor". Appropriate correction is required.

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13. Claim 18 is objected to because of the following informalities: delete “also” on line 1 of the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 112

14. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

15. Claims 3, 5 and 17-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

16. Claims 3 and 5 recite the limitation "said exception handler" in line 13 and lines 23-24 of the claims, respectively. There is insufficient antecedent basis for this limitation in the claim. Therefore, this limitation is interpreted as “an exception handler”.

As per claims 17-18, these claims are rejected for dependency upon rejected base claim 3 above.

17. Claim 17 recites the limitation "the post process" in line 1 of the claim. There is insufficient antecedent basis for this limitation in the claim. Therefore, this limitation is interpreted as “the post-processor”.

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18. Claims 17 and 18 recite the limitation "the address" in lines 1-2 and line 2 of the claims, respectively. There is insufficient antecedent basis for this limitation in the claim. Therefore, this limitation is interpreted as "an address".

Claim Rejections - 35 USC § 102

19. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

20. Claims 1-2, 4, 6-7 and 10-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Dunn (U.S. 6,247,172).

Per Claim 1 (Amended):

The Dunn patent discloses:

- **a compiler for converting source code for a program written in a programming language into object code in a machine language** ("A compiler translates source code written in a high order software language, such as C or pascal, into target code 38, which is an executable application operable on the target platform." in column 5, lines 33-36)

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- **an optimization execution unit for performing an optimization process for an object program written in a machine language** (“The new translator 34, according to the present invention, generates both optimized target code 40 and recovery blocks 42. The new exception delivery system described in Fig. 5, allows the optimized target code 40 to be fully optimized. All optimizations possible in traditional optimization for branching are now legal for the trapping of exceptions.” in column 5, lines 37-42)

- **and a program modification unit for modifying said object program in order to absorb a difference in content between the point of origin of an exception process, which occurs in response to the execution of a command in said object program, and an exception handler whereat said exception process is performed** (“The recovery blocks 42 contains code instructions that when executed restore the target machine state to match the legacy machine state. The recovery blocks 42 can be generated at the same time as the optimized target code 40 for a non-dynamic translation, or can be generated on an “as needed” basis in a dynamic translation. In a non-dynamic system, the translator produces many recovery blocks, up to one for every potential synchronous exception in the optimized target code 40.” in column 5, lines 42-51 and *column 6, lines 19-35*; the recovery block compensates for the difference in content from the point where the exception occurs and the exception handler).

Per Claim 2:

The Dunn patent discloses:

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- wherein, if there is a difference in content between the point of origin of an exception process, which occurs in response to the execution of a command in said object program, and a location whereat said exception process is performed, said program modification unit generates compensation code to compensate for said difference, and inserts said compensation code into said object program (column 5, lines 42-51).

Per Claim 4:

The Dunn patent discloses:

- wherein, before said optimization execution unit performs said optimization process in said object program, said program modification unit divides said command that may cause an exception process into a command portion for determining whether an exception process has occurred, and a command portion for actually causing an exception process; and wherein, when an exception process occurs, said program modification unit modifies said object program to shift program control to said command portion that actually caused said exception process (column 6, lines 1-35).

Per Claim 6 (Amended):

This is a system version of the claimed compiler discussed above, claim 1, wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, this claim is also anticipated by Dunn.

Per Claim 7 (Amended):

This is a method version of the claimed compiler discussed above (claims 1 and 2), wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above, including “moving program control to a portion whereat said exception process is performed” (column 6, lines 10-15). Thus, accordingly, this claim is also anticipated by Dunn.

Per Claim 10 (Amended):

The Dunn patent discloses:

- **an optimization method for optimizing a program to increase processing efficiency** (column 5, lines 37-39)
- **dividing software code, in an object program, that may cause an exception process into software code for determining whether an exception process has occurred and software code for actually causing an exception process** (column 5, lines 39-51; and column 6, lines 36-67 to column 7, lines 1-6)
- **specifying said code obtained at said division step as branches of a control flow graph; designing said control flow graph so that when an exception process occurs, program control is shifted to said code that actually caused said exception process; and performing said optimization process for said object program that has been**

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modified (column 6, lines 1-35; column 6, lines 36-67 to column 7, lines 1-6; and see Figure 6).

Per Claim 11:

The Dunn patent discloses:

- **determining whether code for compensating for a difference in content between the point of origin of an exception process and code for actually causing said exception process have been generated in a block that includes code for the actual performance of said exception process after the optimization process has been run; and using said control flow graphs, when said code for compensating for said content difference is not generated, for synthesizing said two code sets to obtain said code arrangement that existed before said code was divided** (column 5, lines 45-48 and column 6, lines 19-23).

Per Claim 12 (Amended):

This is a computer program version of the claimed compiler discussed above (claims 1 and 2), wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, this claim is also anticipated by Dunn.

Per Claim 13 (Amended):

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This is a computer executable program version of the claimed compiler discussed above (claims 1 and 2), wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, this claim is also anticipated by Dunn.

Per Claim 14:

The Dunn patent discloses:

- wherein said function for determining whether an exception process has occurred is provided by a condition branch (column 6, lines 56-67 to column 7, lines 1-6).

Per Claim 15 (Amended):

This is a storage medium version of the claimed compiler discussed above (claims 1 and 2), wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, this claim is also anticipated by Dunn.

Per Claim 16 (Amended):

This is a apparatus version of the claimed compiler discussed above (claims 1 and 2), wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, this claim is also anticipated by Dunn.

Claim Rejections - 35 USC § 103

21. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

22. Claims 3, 5, 8-9, and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn (U.S. 6,247,172) in view of Ghosh (U.S. 6,412,109).

Per Claim 3 (Amended, as best understood):

The rejection of claim 1 is incorporated, and Dunn further teaches wherein said program modification unit includes: a pre-processor for, before said optimization execution unit performs said optimization process, examine a command that may cause an exception process in said object program to determine whether an exception process has occurred, and performing an inherent process when it is found an exception process has occurred (column 6, lines 1-18), and a post-processor for examining, in said object program that has been optimized by said optimization execution unit, said command that may cause an exception process to determine whether a difference in content exists between said command that may cause said exception process and a location whereat said exception process is performed, and for, when a difference exists, generating a compensation code, to be used to compensate for said difference, and a code for, after said compensation code is obtained, moving program control to an exception handler whereat said exception process is performed (column 6, lines 19-35). Dunn does not

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explicitly teach try-catch blocks for handling exceptions. Ghosh teaches try-catch blocks for handling exceptions (column 5, lines 26-34).

It would have been obvious to one having ordinary skill in the computer art at the time of the invention was made to modify the compiler disclosed by Dunn to include try-catch blocks for handling exceptions using the teaching of Ghosh. The modification would be obvious because one of ordinary skill in the art would be motivated to increase the amount of code that can be optimized, even code that is associated with a try-catch block (Ghosh, column 6, lines 51-60).

Per Claim 5 (Amended, as best understood):

This is another version of the claimed compiler discussed above (claims 3 and 4), wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, this claim is also obvious.

Per Claim 8 (Amended):

This is a method version of the claimed compiler discussed above (claims 1 and 3), wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, this claim is also obvious.

Per Claim 9 (Amended):

The rejection of claim 8 is incorporated, and Ghosh further teaches wherein said step of determining whether a difference in content exists between said command that may cause an exception process and said exception handler whereat said exception

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process is performed includes a step of: removing said basic block prepared for said command that may cause an exception process when no difference in content exists (column 6, lines 51-55).

Per Claim 17 (New, as best understood):

The rejection of claim 3 is incorporated, and Dunn further teaches wherein the post-processor registers an address of the point at which the exception process occurs (column 6, lines 19-35).

Per Claim 18 (New, as best understood):

The rejection of claim 17 is incorporated, and Dunn further teaches wherein the post-processor registers an address of the exception handler (column 6, lines 19-35).

Response to Arguments

23. Applicant's arguments filed on 7/20/04 have been fully considered but they are not persuasive.

In the remarks, the applicant argues that:

a) This invention relates to a computer ...

This modifying is done in order to absorb a difference in content between the point of origin of an exception process, which occurs in response to the execution of a command in said object program, and an event handler whereat said exception process is performed. ...

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Dunn fails to disclose or suggest the above-discussed program modification unit, and more specifically, the use of event handler as described above. More specifically, in this invention, the compensation code “to absorb a difference ...” has a different objective from Dunn’s recovery block 42. The target machine state of compensation code of this invention is the “target machine” state at an exception handler. However, the target machine state of the recovery block of Dunn is the “legacy machine” state at the code that is throwing the current exception. Therefore, they are different locations and different states. ...

The legacy machine state is the machine state that could have resulted had the target platform executed “target code not optimized by the compiler” (Dunn, column 3, line 52). In contrast, in the approach of this invention, program control is shifted through compensation codes to the exception handler in order to “absorb the difference between the point of origin of the execution occurrence points and the exception handler.” For example ... recovery block.

Examiner’s response:

a) Examiner strongly disagrees with applicant’s assertion that Dunn fails to disclose the claimed limitations recited in claims 1-2, 4, 6-7 and 10-16. Dunn clearly shows each and every limitation in claims 1-2, 4, 6-7 and 10-16.

In response to applicant’s argument that the references fail to show certain features of applicant’s invention, it is noted that the features upon which applicant relies (i.e., “event handler”) are not recited in the rejected claim(s). Although the claims are

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interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Dunn teaches a program modification unit for modifying said object program in order to absorb a difference in content between the point of origin of an exception process, which occurs in response to the execution of a command in said object program, and an exception handler whereat said exception process is performed (column 5, lines 42-51 and *column 6, lines 19-35*; the recovery block compensates for the difference in content from the point where the exception occurs and the exception handler).

In addition, see the rejection above in paragraph 20 for rejection to claims 1-2, 4, 6-7 and 10-16.

In the remarks, the applicant argues that:

b) Another important difference between Dunn, et al. and the preferred embodiment of this invention is that Dunn, et al. considers only hardware trapping instructions, which directly jump to the operating system when detecting an exception, as shown in Dunn, et al, Figures 2 and 5. In contrast, the preferred embodiment of the present invention may be used to cover not only hardware trapping instructions but also software exception checking instructions, such as SIZECHECK. ... Therefore, the Dunn, et al approach cannot, for example, transform Figure 16 of this application into Figure 18 regarding SIZECHECK.

Examiner's response:

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b) In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "software exceptions" and "hardware exceptions") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In the remarks, the applicant argues that:

c) Each of independent Claims 1, 6, 7, 8, 12, 13, 15 and 16 describe the above-discussed feature of this invention relating to the way the exception handler is used. ... compensating for said difference before program control is shifted to said exception handler.

Examiner's response:

c) The Examiner has already addressed the applicant's arguments regarding exception handler in the Examiner's Response (a) above. In addition, see the rejection above in paragraph 20 for rejection to claims 1-2, 4, 6-7 and 10-16.

In the remarks, the applicant argues that:

d) The other references of record have been considered, and these other references, whether considered individually or in combination also do not disclose or suggest the use of the exception handler in this way. For example, Ghosh was cited for its disclosure of try-catch block for handling exceptions, but this reference does not use an exception

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handler to identify a point in a process with respect to which differences should be measured or compensated for, as described in Claims 1, 6, 7, 8, 12, 13, 15 and 16.

Examiner's response:

d) In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Furthermore, the Examiner has already addressed the applicant's arguments regarding exception handler in the Examiner's Response (a) above. In addition, see the rejection above in paragraph 20 for rejection to claims 1-2, 4, 6-7 and 10-16.

In the remarks, the applicant argues that:

e) Another important feature disclosed in this application that is not disclosed in or suggested by Dunn et al, involves the division of the software code relating to the exception process. More specifically, in accordance with this feature, an application program (or software) detects and throws an exception; however, the Dunn, et, al. approach (Dunn, column 6, lines 1-35) supposes that the hardware detects and throws an exception. The approach of the present invention divides a software exception check into a detection portion and a throwing exception portion within "the application program," as shown in Figure 26 of this application. Therefore, this approach of this invention enables that an execution is directly transferred within the application program. In contrast, the

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Dunn, et al. technique is limited by the fact that an execution must be transferred via the operating system (Dunn, et al. column 6, lines 1-35).

Independent Claim 10 describes this feature. More particularly, Claim 10 is directed to a method for ... this claim positively sets forth the step of dividing software code, in an object program, that may cause an exception process into software code for determining whether an exception process has occurred and software code for actually causing an exception process. Claim 10 goes on to describe that a control flow graph is designed so that when an exception process occurs, program control is shifted to the code that actually caused the exception process.

The other references of record also fail to disclose or suggest this feature of Claim 10. In particular, again, Ghosh was cited for ..., but this reference does not suggest the above-described procedure for dividing a software exception check into a detection portion and a throwing exception portion.

Examiner's response:

e) Examiner strongly disagrees with applicant's assertion that Dunn fails to disclose the claimed limitations recited in claim 10. Dunn clearly shows each and every limitation in claim 10.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "software exceptions" and "hardware exceptions") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations

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from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Dunn teaches dividing software code, in an object program, that may cause an exception process into software code for determining whether an exception process has occurred and software code for actually causing an exception process (column 5, lines 39-51; and column 6, lines 36-67 to column 7, lines 1-6); and specifying said code obtained at said division step as branches of a control flow graph; designing said control flow graph so that when an exception process occurs, program control is shifted to said code that actually caused said exception process; and performing said optimization process for said object program that has been modified (column 6, lines 1-35; column 6, lines 36-67 to column 7, lines 1-6; and see Figure 6).

In addition, see the rejection above in paragraph 20 for rejection to claim 10.

In the remarks, the applicant argues that:

f) Because of the above-discussed differences between Claims 1, 6, 7, 8, 10, 12, 13, 15 and 16 ... Accordingly, these claims patentably distinguish over the prior art and are allowable. ...

Claims 2-5, 17 and 18 are dependent from Claim 1 and are allowable therewith; and Claim 9 is dependent from, and is allowable with, Claim 8. ... Consequently, the Examiner is requested to reconsider and to withdraw the rejection of Claims 1, 2, 4, 6, 7 and 10-16 under 35 U.S.C. §102 and the rejection of Claims 3, 5, 8 and 9 under 35 U.S.C. §103, and to allow Claims 1-18.

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Examiner's response:

f) The Examiner has already addressed the applicant's arguments in the Examiner's Responses (a) thru (e) above. In addition, see the rejection above in paragraph 20 for rejection to claims 1-2, 4, 6-7 and 10-16, and paragraph 22 for rejection to claims 3, 5, 8-9, and 17-18.

Conclusion

24. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

25. Any inquiry concerning this communication from the examiner should be directed to Qamrun Nahar whose telephone number is (703) 305-7699 ***if calling before October 28, 2004***; otherwise ***if calling on or after October 28, 2004***, then the telephone number is (571)272-3730. The examiner can normally be reached on Mondays through Thursdays from 9:00 AM to 6:30 PM. The examiner can also be reached on alternate Fridays.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kakali Chaki, can be reached on (703) 305-9662. The fax phone number for the organization where this application or processing is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

QN
October 19, 2004

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